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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/784,616	02/15/2001	John E. Stauffer	STF-115-A	2642

7590

04/22/2003

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EXAMINER

NGUYEN, NGOC YEN M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 04/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-4

Office Action Summary

Application No.

09/784,616

Applicant(s)

STAUFFER, JOHN E.

Examiner

Ngoc-Yen M. Nguyen

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

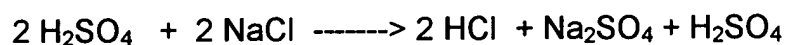
Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nachod et al (2,475,752), in view of Babor ("Basic College Chemistry", second edition; pages 255-261) and Felder et al ("Elementary Principles of Chemical Processes", page 106), optionally in view of Perry's Chemical Engineers Handbook.

Nachod '752 discloses a process for producing hydrogen chloride which comprises a first step in which sodium chloride and sulfuric acid are reacted in a rotary, internally heated, furnace to produce a gaseous mixture containing hydrogen chloride, water vapor and inert diluents; a second step in which most of the hydrogen chloride and a large portion of the water, in the hydrogen chloride-containing gases to be treated for hydrogen chloride recovery, are absorbed in substantially constant boiling point, or stronger, hydrochloric acid to give an acid above about 21% HCl concentration and leaving an unaborsed effluent gas (note column 2, lines 10-25). As shown in Figure 1 and described in column 3, lines 43-73, sodium chloride was fed to the charging end of a rotary furnace. Sulfuric acid was simultaneously fed to the furnace by separate conveyor means. The sodium chloride (salt) and acid were mixed and reacted in the weight ratio of about 1.2 to 1 while flowing countercurrent to and being heated

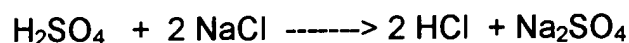
(internally) by hot combustion gases delivered to the furnace through an opening in the other (burner) end thereof. The resulting salt cake (Na_2SO_4) was discharged through an opening in the burner (hotter) end of the furnace, while the hydrogen chloride (HCl), mixed with water vapor and the combustion gas was discharged from the charging end of the furnace.

The rotary furnace which has a burner on one end as described in Nachod '752 is considered as the claimed "direct fired reaction chamber" or the claimed rotary kiln. Since the process of Nachod '752 has all the positive process limitations as the claimed process, the salt cake produced in the process of Nachod '752 would inherently be chloride-free, as required in the claimed process.

Since the process of Nachod '752 has all the positive process limitations as required in the instant claims, the chemical reactions taking place in the rotary furnace of Nachod '752 would naturally be the same as the claimed chemical reactions. It should be noted when all the chemical reactions as required in the instant claim 1 are added together, the net chemical reaction would be reaction (7) as stated on page 6 of the instant specification,



However, by canceling the H_2SO_4 from the product side with one of the H_2SO_4 from the reactant side, the net reaction would be



and this equation is the same as the equation disclosed in column 3 of Nachod '752. In any event, it is elementary that the mere citation of a newly discovered function or property, inherently possessed by things in the prior art, does not cause a claim drawn to distinguish over the prior art. Additionally, where the Patent Office has reason to believe that a functional limitation asserted to be critical for establish novelty in the

Art Unit: 1754

claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on, *In re Swinehart*, 169 USPQ (CCPA 1971). There is no difference seen between the "fresh" sulfuric acid (the acid in reaction 3) and the "formed" acid (in reaction 6), because even when the sulfuric acid and the sodium chloride is used in 1:2 ratio, sodium hydrogen sulfate would still be formed, and this in turn will form $\text{Na}_2\text{S}_2\text{O}_7$, then Na_2SO_4 and SO_3 and the formed SO_3 will react with water to form sulfuric acid and the formed sulfuric acid will then involve in the reaction (3).

For the instant claim 3, the examiner takes Official Notice that potassium chloride and sodium chloride are analogous in the art (both are alkali metal chloride) and it would have been obvious to one of ordinary skill in the art to use the process of Nachod '752 to produce hydrogen chloride from potassium chloride instead of sodium chloride.

The differences are Nachod '752 does not disclose that (1) the sulfuric acid and alkali metal chloride are used in a molar ratio of approximately one to one and (2) the ratio of kiln length to diameter.

For difference (1), as stated above, Nachod '752 discloses a molar ratio of sulfuric acid to alkali metal chloride of 1 to 2. However, Babor teaches that for any reaction, the velocity is equal to the velocity constant for that reaction multiplied by the concentrations of the reacting substances, each concentration being raised to that power indicated by the coefficient of the substance in the equation for the reaction or to state it another way: the velocity is proportional to the product of the concentrations of the reacting substances, each concentration being raised to that power indicated by the coefficient of the substance in the equation for the reaction (note page 259, last full paragraph). Thus, it would have been obvious to increase the concentration of either

reactants to increase the reaction rate. In this case if sodium chloride was used in excess, the excess solid sodium chloride remained would be harder to be separated from the solid sodium sulfate product. Thus, it would have been obvious to use excess sulfuric acid in the process of Nachod '752. In this case the molar ratio of sulfuric acid to sodium chloride would be greater 1 to 2.

Felder is applied to teach that it is rare that a chemical reaction proceeds to completion in a continuous reactor, no matter how much reactant is present to begin with or how long the reaction mixture remains in the reactor, some reactant is normally found in the product. Felder further teaches that the unreacted reactant can be separated from the product and recycled back to the reactor because the cost for the separation and recycle equipment can be compensated by having to purchase less fresh reactant and being able to sell the purified product at a higher price (note second and third paragraph of page 106 and Figure 5.5.-1).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use excess sulfuric acid in the process of Nachod '752 as suggested by Babor in order to increase the reaction rate and to recycle the remained excess sulfuric acid back to the reaction as suggested by Felder in order to reduce the amount of fresh reactant required for the reaction. The decision to use an excess amount of one of the reactants to increase the reaction rate is depend upon whether or not the benefit (i.e., the increase of the reaction rate) is outweighed the cost (i.e, the cost of the excess reactants, the cost of recovering and recycling the excess reactant).

For difference (2), for the ratio of kiln length to the shell diameter, it would have been obvious to one of ordinary skill in the art to optimize such ratio in order to obtain the best results. As to the slope for the kiln, Nachod '752 discloses that the rotary

furnace is "substantially horizontal" (note column 3, lines 45-47) which fairly suggests that the furnace is slightly sloped as evidenced in the drawing (note drawing, item 11).

Optionally, Perry (Chemical Engineers Handbook) can be applied to teach that it is conventional in the art for the size of a rotary kiln to vary from 6 ft by 60 ft (ratio = 10) to 12 ft by 450 ft (ratio = 37.5) (note page 20-36, right column, third full paragraph). This range is well within the claimed ranges. Thus it would have been obvious to one of ordinary skill in the art to optimize the ration of kiln length to shell diameter and the kiln inclination within the known ranges as suggested by Perry to obtain the best results, In re Aller 105 USPQ 233, In re Boesch, 617 F.2d 272, 276, 205, USPQ 215, 219 (CCPA 1980).

In the specification, under "Cross-reference to Related Application". It is unclear if the 09/413,226 application is a continuation or continuation-in-part of 08/886,383.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The earlier edition of the Chemical Engineers' Handbook is cited to one reason for the rotary kiln widespread application is its adaptability for continuous operations (note second full paragraph under "Uses of Rotary Kilns").

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (703) 308-2536. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (703) 308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are (703)


Application/Control Number: 09/784,616

Page 7

Art Unit: 1754

872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
April 20, 2003